Seattle Car Accidents

PREDICTING SEVERITY INJURIES

NALIN NADGAUDA

Business Understanding

Consequences of car accidents:

- there may be people with injuries or fatalities;
- displacement of police vehicles;
- displacement of rescue vehicles;
- congestion in the area;
- delays for car and bus users.

Business Understanding

Most interested of accident prevention / reduction:

- Seattle Department of Transportation

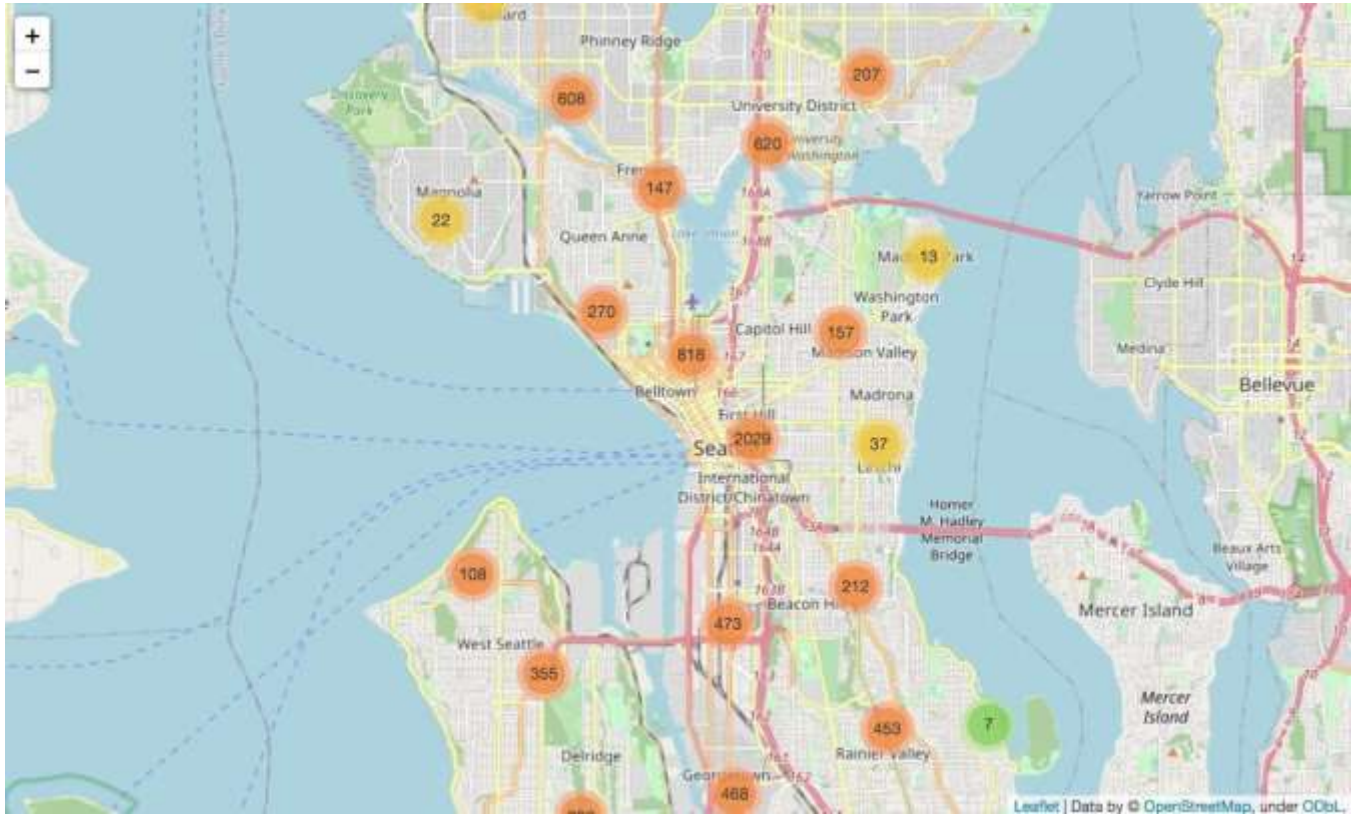
Data Understanding/Preparation

Data Wrangling:

- identify duplicate columns;
- eliminate unnecessary columns;
- verification and cleaning of NaN data;
- conversion of categorical features to numerical values;
- balance de values;
- normalize values;
- etc.

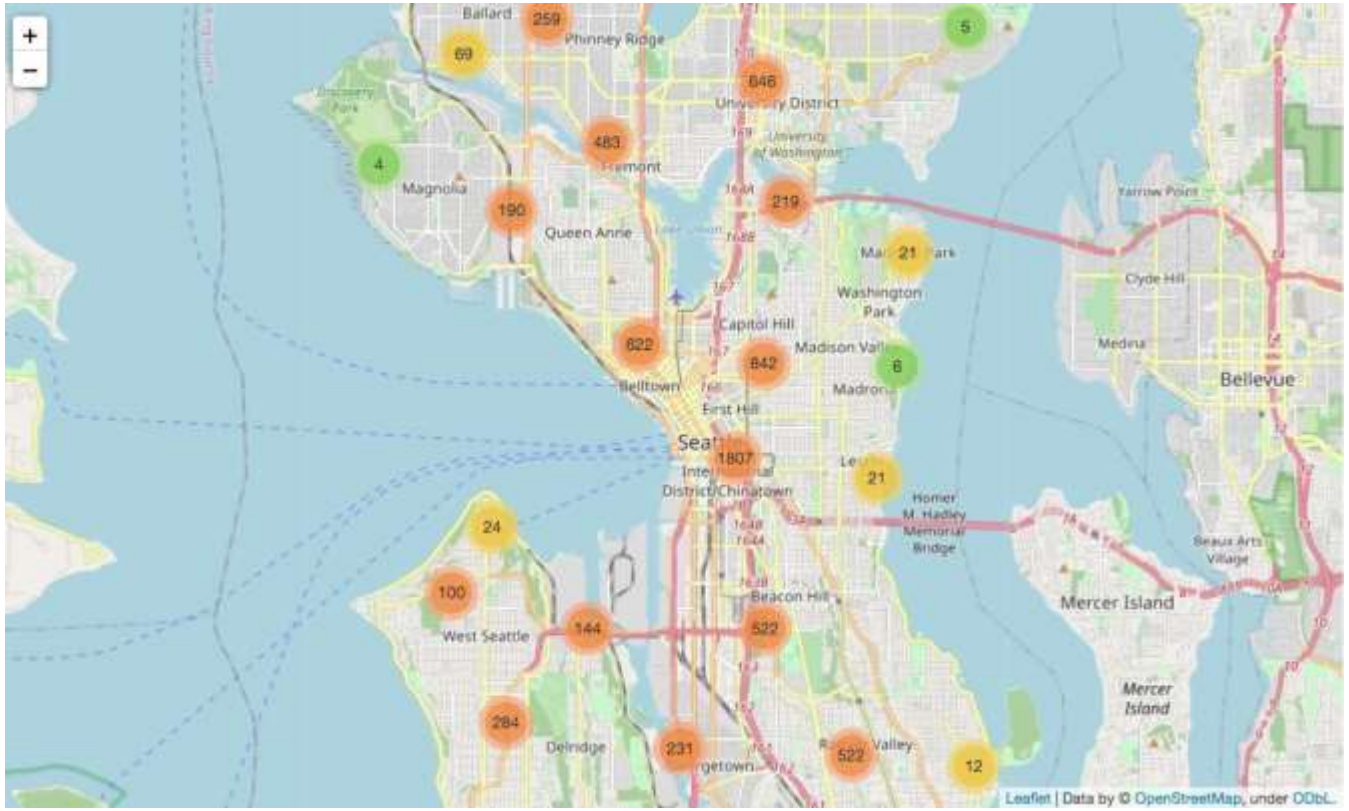
Results

Possibility of concentration of incidents on specific area. 2017



Results

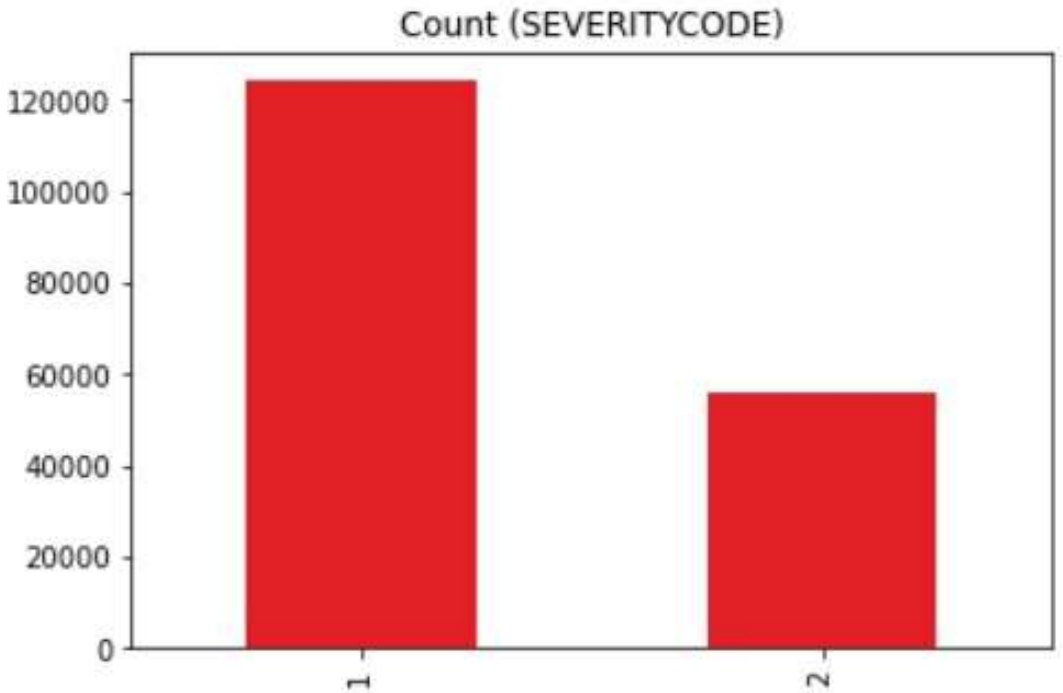
Possibility of concentration of incidents on specific area. 2018



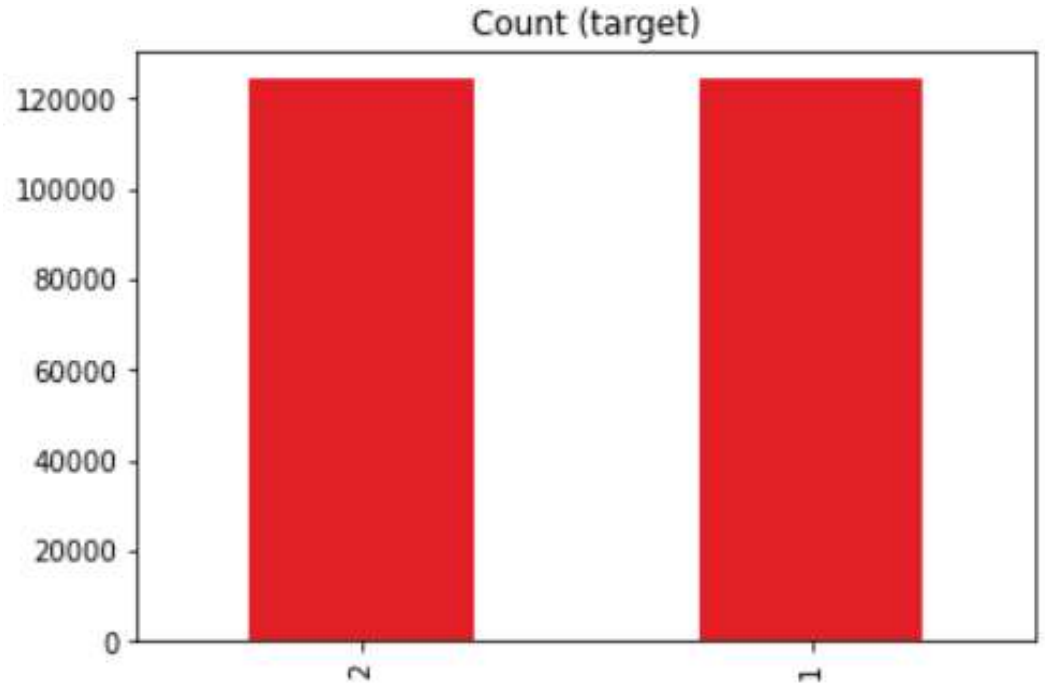
Methodology

Balance of the Data:

Before normalization



After normalization



Prediction results

Decision Tree

In [61]:
```
from sklearn.metrics import jaccard_score
from sklearn.metrics import f1_score
from sklearn.metrics import log_loss
```

In [62]:
```
from sklearn.tree import DecisionTreeClassifier
DT_model = DecisionTreeClassifier(criterion="entropy", max_depth = 4)
DT_model.fit(X_train,y_train)
DT_model
```

Out[62]:
```
DecisionTreeClassifier(criterion='entropy', max_depth=4)
```

In [63]:
```
yhat = DT_model.predict(X_test)
yhat
```

Out[63]:
```
array([2, 2, 1, ..., 1, 1, 2])
```

In [64]:
```
#DT_yhat = DT_model.predict(X_test)
print("DT Jaccard index: %.2f" % jaccard_score(y_test, yhat))
print("DT F1-score: %.2f" % f1_score(y_test, yhat, average='weighted') )
```

```
DT Jaccard index: 1.00
DT F1-score: 1.00
```

Conclusion

- prediction with an accuracy index close to 100%;
- possibility to extract more insights from the dataset;

- Data Scientist:
  - vast field to be explored;
  - more studies for professional improvement.